

CLAIMS

What is claimed is:

1. In combination comprising:
an actuator member; and
an assist mechanism comprising an assist element that is adapted to store energy to assist in moving the actuator member, the assist element is carried between two members that act upon the assist element to cause the assist element to store energy when the actuator member is moved in an extended direction and releases the energy when the actuator member is moved in a retracted direction opposite to the extended direction.
2. The combination according to claim 1, further including an outer tube from which the actuator member extends, the assist element being carried by the outer tube.
3. The combination according to claim 2, wherein the members acting upon the assist element are abutment members.
4. The combination according to claim 3, wherein one of the abutment members is maintained in a fixed position and the other abutment member is adapted to move responsive to movement of the actuator member.
5. The combination according to claim 4, wherein the fixed abutment member is fixed relative to the outer tube and the movable abutment member is movable relative to the outer tube.
6. The combination according to claim 5, wherein the assist element is a spring, whereby upon extending the actuator member, the movable abutment member is moved to cause the spring to be compressed to store energy and upon retracting the actuator member, the movable abutment member is free to move to permit the spring to release the energy.

7. The combination according to claim 2, wherein the members acting upon the assist element are abutment members including a clamp fixed relative to the outer tube and a collar guide movable relative to the outer tube, the assist element being a helical compression spring located between the clamp and the collar guide.

8. The combination according to claim 1, wherein the members acting upon the assist element include a movable abutment member that is adapted for movement by forming a connection between the actuator member and the movable abutment member.

9. The combination according to claim 8, wherein the connection between the actuator member and the movable abutment member includes one or more connection members that extend between the actuator member and the movable abutment member.

10. The combination according to claim 9, wherein the one or more connection members are cable assemblies comprising a cable having opposite ends including a fixed end and a movable end, the fixed end being fixed relative to the actuator member and the movable end being adapted to move and engage the movable abutment member.

11. The combination according to claim 10, wherein a clevis is fixed to the actuator member, the fixed end being attached to the clevis so that the cable extends from the clevis beyond the abutment member.

12. The combination according to claim 10, wherein the members acting upon the assist element include a fixed abutment member and a movable abutment member, each of the abutment members being provided with one or more guides through which the cables pass.

13. The combination according to claim 10, wherein the cables, upon retracting the actuator member beyond a certain distance, extend beyond the movable abutment member.

14. The combination according to claim 13, further including a stop member to limit travel of the movable abutment member when the actuator member is retracted so that the cables extend beyond the movable abutment member.

15. The combination according to claim 14, further including an outer tube from which the actuator member extends, the stop member being an O-ring on the outer tube.

16. In combination:
a frame;
a seat; and
an actuator for use in moving the seat relative to the frame, the actuator comprising:

an actuator member; and

an assist mechanism comprising an assist element that is adapted to store energy to assist in moving the actuator member, the assist element is carried between two members that act upon the assist element to cause the assist element to store energy when the actuator member is moved in an extended direction and release the energy when the actuator member is moved in a retracted direction opposite to the extended direction.

17. The combination according to claim 16, wherein the actuator further includes an outer tube from which the actuator member extends, the assist element being carried by the outer tube.

18. The combination according to claim 17, wherein the members acting upon the assist element are abutment members, one of the abutment members being in a fixed position relative to the outer tube and the other abutment member being adapted to move relative to the outer tube responsive to movement of the actuator member.

19. The combination according to claim 17, wherein the assist element is a spring, whereby upon extending the actuator member, the movable abutment member is moved to cause the spring to be compressed to store energy and upon retracting the actuator member, the movable abutment member is free to move to permit the spring to release the energy.

20. The combination according to claim 17, wherein one or more cables each has a fixed end that is fixed relative to the actuator member and a movable end that is adapted to move and engage the movable abutment member.